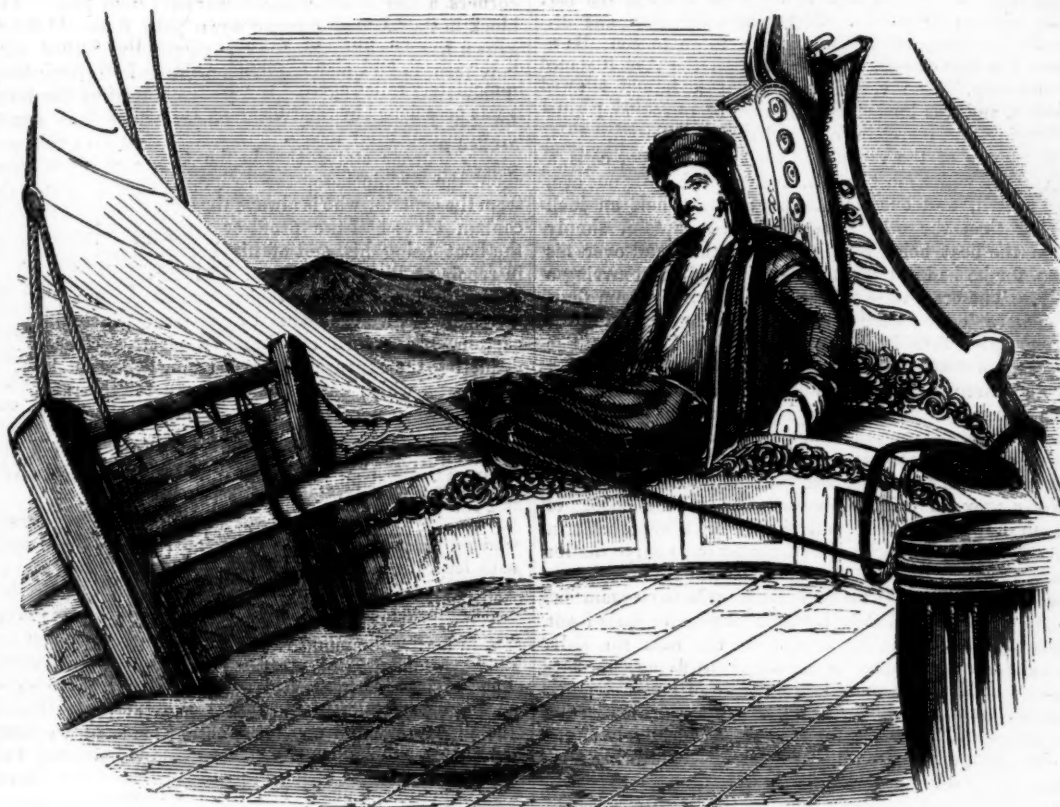


TURKEY AND THE TURKISH PROVINCES.



GREEK RIE, OR CAPTAIN.

THE ARCHIPELAGO, AND ITS MARINERS.

At the eastern extremity of the Mediterranean a very remarkable arm of the sea bends towards the north; remarkable as forming the maritime separation between Europe and Asia; as being the channel by which Constantinople and the Black Sea are reached; as being studded with a vast number of islands; and as having been in Europe, almost the birthplace of civilization. This is the *Ægean Sea*; and the islands which stud it form collectively the Grecian Archipelago.

If we examine a map of this region, we see that the whole western shore of Asia Minor bounds it on the east; that some of the Turkish provinces bound it on the north; and that Greece—anciently independent, then under the yoke of the Turks, and now independent again,—forms its western boundary. This portion of sea is about four hundred miles from north to south, and two hundred from east to west. The islands, which are so numerous that they have never been accurately counted, lie scattered over nearly the whole of this sea; some are beautifully fertile and picturesque, producing wine, oil, gums, raisins, figs, silk, honey, wax, oranges, lemons, cotton, &c.; while others are mere barren masses of rock. Of these islands, those whose names are best known to general readers are Samos, Scio, Lemnos, Mitylene, Patmos, Cos, Naxos, Paros, Antiparos, Milo, and Argenteria.

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The inhabitants of these islands are a fine, hardy, athletic race, generally good sailors. Their dress consists of a short jacket and waistcoat, without a collar, very full breeches, with a red sash round the waist, a small red cap fitting close to the crown of the head, and shoes resembling our slippers. The legs and throats are generally bare; they wear moustaches, but never beards; and the hair is made to hang back over the neck to a great length. The women are generally beautiful, and their dress simple; when not employed in their household occupations, their time is chiefly taken up with spinning, knitting, and weaving.

It is, however, in a maritime point of view that we are about to consider this singular region. The islands being very small, the inhabitants on each are few in number; and as they are obliged to depend a good deal on each other, it results that much intercourse is maintained from island to island. The Greeks of the Levant have thus become good sailors; and form the principal part of the crews in the Turkish as well as the Greek vessels. Among the vessels here employed, one which is found in that corner of the Archipelago leading to the Black Sea, is the *caïque*, a small kind of sloop, with sails, and a few rowers. These *caïques* are long, narrow, boats, extremely light, and provided with one, two, or three small sails, which are set only in fair weather, or when the wind is not too strong. They are not provided

with ballast, and are so buoyant that a somewhat stiff breeze would overset them, if the boatman did not take care to let go the sail on the smallest danger and to turn the boat by shifting the helm. The caiques belonging to the Sultan are remarkable for their size, their elegance, and the number and dexterity of the rowers; these latter are twenty-eight in number, and are dressed in white.

The vessels that go greater distances are, of course, of larger size, and are better provided with sails. We cannot perhaps better illustrate the nature of such a vessel and of its crew than by following the narrative of a traveller in these seas. Some years ago, Mr. Turner, an Englishman, left Constantinople to go to Syria in a small Turkish vessel, passing through the Archipelago in his way. The vessel was about a hundred tons burden, and was loaded with a cargo of olives and nuts belonging to a merchant of Candia named Tussein Ago. The captain of the vessel was what Mr. Turner calls a *sans souci*, with a most extraordinary face, having one eye, one nostril, and one moustachio at least half an inch higher than the other; he was called captain, simply from the boat being his; he had no command over his men, for he had not the slightest idea of manœuvring a ship. The crew were twelve in number, of whom four, who were Turks, were very inefficient seamen; and the other eight were intelligent and active Greeks. The passengers consisted of about thirty persons, comprising two or three English gentlemen, two Frenchmen, the Candiot merchant and his brother, and several Turks and Greeks. Among them was a very devout Turk, who regularly performed his ablutions and prayers five times a day, and every evening, taking an hour-glass in his hand, sang a prayer for favourable weather, in the chorus of which he was joined by all the other Mohammedans. The Turkish passengers paid from forty to fifty piastres each, for their passage from Constantinople to Cyprus; the Englishmen paid much higher, under an agreement to be provided with board, which proved to be of the sorriest kind. On the day after they started, Mr. Turner was astonished to see all the sails still up, notwithstanding a gale was blowing, which to most seamen would have been a hint to "furl." He represented the danger, but all in vain; for they were excessively angry at his remonstrances, which they said would bring misfortunes upon them, for, "if they were destined to perish, all precautions would be in vain;"—this is an example of the power of the notion of fatalism on the Turkish character. On the same evening a dispute arose among the Turkish passengers:—the merchant Tussein, on account of the cold, wanted to perform his ablutions in warm water; but this the Turkish devotee would not allow to be lawful, insisting that there was no instance on record of Mohammed having so acted. Tussein retorted on the devotee, that he had been praying sitting, which he asserted was not consistent with their religion; but the devotee replied, that he had only done so that evening during the gale, when the ship rolled so that he could not stand on the deck, and that in this case there was a special permission granted to Mohammedans at sea to pray sitting:—thus the dispute ended.

The party landed occasionally at the islands which they passed, visiting the objects most worthy of notice, and then embarking again to proceed on their voyage. The instances of superstition and ignorance which they met with in the crew and passengers were many, and some of them ludicrous; but we will only allude to one or two which relate to navigation, and which obtain great credit among the Turkish seamen. The English travellers having one evening sought to relieve the tedium of the voyage by a game at cards, Tussein came into the cabin and begged them to desist, urging that some misfortune would else surely happen to the ship; and to induce them to believe him, he related a story of what had once happened to himself:—He was once detained at Rhodes twenty-eight days by contrary winds,

during which he amused himself by playing cards with the crews of some other ships. The captain, much vexed at the delay, at length said he was sure there must be some cause for the contrary winds; and going down to search the cabin, he found the cards, which he flung overboard in a great rage. Immediately the wind became fair, and they had a very prosperous voyage to Alexandria; but the other ships, three in number, whose crews had not thrown away their cards, were all taken by an enemy's squadron;—that the cards were the cause of the contrariety of the wind, Tussein stoutly maintained. A day or two afterwards, while sailing round a cape, a sudden gust of wind disturbed the equilibrium of the vessel, and also of an old Turkish passenger, who immediately railed against the Englishmen, and said that it was occasioned by their drinking rum, and not performing ablutions after meals.

Mr. Turner states that in the Greek boats trading about the Archipelago, the sailors receive no fixed pay from the captain, who is always the owner of the boat; the captain takes half the profit or freight, on account of the boat being his, and of his being obliged to keep it in repair at his own expense; he then divides the other half with his comrades, taking two shares for himself. For instance, a boat manned by four men, including the captain, has gained one hundred piastres clear, after deducting the expense of provisioning; the captain first takes fifty, which he lays aside to pay for the repairs of the boat when necessary; he then out of the remaining fifty takes twenty, and gives ten a-piece to his three men. In the Idriote vessels, the captain (when owner), after supplying provisions, and paying all expenses, takes half the profit for the ship, and then divides the remainder among himself and the crew, taking two shares for himself, giving two to the boatswain, two to the *scrivano*, or supercargo, one and a half to the cook, and one to each man.

We will now accompany another traveller, Mr. Emerson, in a voyage among the islands of the Archipelago. This gentleman, in his *Letters from the Ægean*, says:—

There is more intense excitement in sailing by night in the Levant than in any other sea I have ever passed over. There are a thousand possible dangers from sudden squalls, and pirates, and sunken rocks, that keep the imagination on a continued stretch: then the softened azure of the midnight sky is so pure and placid, and its little twinkling stars are so sparkingly reflected in the deep dark sea beneath them; and if, as is seldom the case, it be a night of clouds and darkness, there will follow in the wake of the vessel a long line of phosphorescent light, which heaves and glitters like a stream of lava, till it again subsides into dimness and repose.

Mr. Emerson, after visiting Smyrna, engaged a passage from thence on board a brig, commanded by a Greek, named Panagies Androcopoulo. The vessel proceeded slowly on its voyage, now stopping to let the passengers enjoy the beautiful scenery on shore, now stopping for want of wind to move onwards: sometimes she narrowly escaped being captured by the Greek pirates which infest these seas, and at other times met with small vessels from which sponge-divers were carrying on their hazardous occupation. The captain bore down upon almost every island they came to, in accordance with the arrangement entered into with his passengers; but even without such arrangements, the captains of these small passage-vessels are accustomed to do so, seldom remaining more than eight and forty hours at a time at sea. In this part of the Mediterranean islands are so frequent, that the navigation seems rather inland than at sea. One cluster of islands is never lost sight of till another appears; and as the seamen who traffic from port to port form numerous acquaintances at each, a trip through the Archipelago is, to a Greek, merely a succession of visits to old friends, since he only parts with one in the morning to sup with another at night. This circumstance has a singular effect on the navigation of these parts, for the reis, or captain,



does not trouble himself much about charts or log-books, observations or bearings; his vessel is to him as much a yacht as a merchant-vessel, and his voyage as much one of pleasure as one of business. This tendency in the Greek sailors to land, for enjoyment's sake, whenever an opportunity offers, has been humorously alluded to by a modern writer:—

A merchant, who, sailing from Greece to Trieste,  
Grew vexed with the crew, and avowedly testy,  
Because, as he said, being lazy and Greeks,  
They were always for putting in harbours and creeks,  
And instead of conveying him quick with his lading,  
(As any men would who had due sense of trading,)  
Could never come near a green isle with a spring,  
But smack they went to it like birds on the wing.

After going to Rhodes and some other islands, Mr. Emerson made a further passage, in a small brig-of-war, of eighteen guns, which had formerly been employed by the Greek merchants to carry wheat to Spain and France, but had afterwards exchanged her grain for guns. Her cabin was high and roomy, built of unpainted fir, hung with arms and amber pipes, and surrounded by a divan, on which the captain and his second officer were wont to take their coffee and smoke their chibouques. The ship's company were a set of good-humoured but idle fellows; whose time was chiefly spent in sleeping, singing, or playing cards; and they would lie for hours together under the shadow of a sail, laughing and shouting over their favourite game of casino. Navigation appeared to be very little understood by the captain or his officer, for the cruises of the vessel were such as seldom kept it far distant from land.

By confining our attention, however, exclusively to the smaller maritime enterprises of the inhabitants of these islands, we scarcely do justice to the Greek seamen. Their general merits as mariners will be better understood from the following extract from a writer on this subject:—

The Greeks are universally addicted to commerce, and their marine is in many respects highly important. The islanders form the most enterprising portion of the nation, and carry on a petty trade in numberless half-decked boats, with high stems and sterns, and one thick short mast, with a long yard. They perform these voyages even as far as Constantinople and Smyrna, without chart or compass, and merely, as of old, by the observation of coasts and headlands. But they are acquainted with the management of the largest vessels of European construction, and besides navigating the Ottoman navy as seamen, they have large merchant-ships of their own, which trade as far as America and the West Indies, and make an occasional voyage to England. The natives of Hydra particularly, the most expert of the Greek mariners, have accumulated great wealth by their commerce, and have purchased from the Turks the independent election of their own magistrates. The number of Greek mariners actually employed at sea, is supposed to be not less than fifty thousand, and they are considered as capable of being trained to any kind of naval service.

With certain modifications resulting from the change in the relations between the Greeks and the Turks, the above account would be applicable in our own day.

If the stroke of War  
Fell certain on the guilty head, none else—  
If they that make the cause might taste the effect,  
And drink themselves the bitter cup they mix;  
Then might the Bard, the Child of Peace, delight  
To twine fresh wreaths around the Conqueror's brow;  
Or haply strike his high-toned harp, to swell  
The trumpet's martial sound, and bid them on  
When Justice arms for vengeance; but, alas!  
That undistinguishing and deathful storm  
Beats heaviest on the exposed and innocent;  
And they that stir its fury, while it raves,  
Safe and at distance, send their mandates forth  
Unto the mortal ministers that wait  
To do their bidding!

CROWE,

## OLD ENGLISH NAVIGATORS.

WILLOUGHBY, CHANCELOR, AND BURROUGHS.

### II.

WHEN Richard Chancellor parted from his commander, he seems to have gone on considerably to the north, for he speaks of having arrived at a place, where was perpetual daylight,—“a continual light and brightness of the sun, shining clearly upon the great and mighty sea.” He must, however, have taken an easterly, and then a southern direction, before many days; for he succeeded without difficulty in reaching Wardhuys, where he waited for a considerable time for his companions; after which, disregarding the alarming reports of perils that would beset his farther progress, he pushed on gallantly towards his mysterious destination. The adventurers were guided to the entrance of an immense bay, which was no other than the White Sea, as yet unknown to Western Europe. They espied a little fishing-boat, the crew of which, having never seen a vessel of such a comparatively vast size as the Edward Bonadventure, took the alarm and fled at full speed. Chancellor, with his party, pursued and overtook them; whereupon they fell flat on the ground, half dead, crying for mercy. He kindly raised them; and by looks, gestures, and gifts, expressed the most kind intentions. Being then allowed to depart, they reported everywhere “the singular gentleness and courtesie of the strangers;” so that the natives came in crowds, and the sailors were well supplied with provisions and everything they wanted.

After inquiring on what part of the world they had been thrown, our navigators found that they were at the extremity of a vast country, but imperfectly known in Europe by the name of Russia or Muscovy, and then under the absolute rule of a sovereign named Ivan Vasilovitch, who held his court at Moscow, which was 1500 miles distant, and could only be reached by sledges over the snow. Chancellor sought, and obtained, permission to visit the capital. He was favourably received by the czar, and his able agency laid the foundation of that commercial intercourse, which has since subsisted with little interruption between England and Russia.

We are told that the English navigators were astonished at the pomp and magnificence of the Russian court. The czar behaved at first in a reserved and stately manner towards the strangers; but at another interview conversed more familiarly with them. “The prince called them to his table, to receive each a cup from his hand to drinke, and took into his hand Master George Killingworthes beard, which reached over the table, and pleasantly delivered it to the metropolitan, who, seeming to bless it, said in Russ, ‘This is God’s gift;’ as indeed at that time it was not only thick, broad, and yellow coulered, but in length five foot and two inches of assize.”

In the following spring, Chancellor sailed from Archangel, and arrived safely in England, bringing with him a letter from the czar to Edward VI. This letter expressed a cordial desire to open an intercourse with England, and to grant to the Company of Merchants-Adventurers every privilege necessary to enable them to carry on traffic in his kingdom.

Thus the expedition had failed in its immediate object, besides the disastrous loss of Willoughby and his associates; but the prospect of establishing a trade with an extensive empire served as some compensation. A new charter was granted to the Society of Merchants-Adventurers, who assumed the title of “The Muscovy Company.” Chancellor was sent out again, with credentials from Philip and Mary, and commissioned to treat with the czar of Muscovy, respecting the commercial privileges and immunities which his majesty might be pleased to grant to the newly-chartered company. The original object, however, of a passage to India by

the pole, eastward, was still kept in view. The adventurers were instructed not merely to seek for commercial gain, but also to increase their geographical knowledge, and "to use all wayes and meanes possible to learne howe men maye pass from Russia, either by land or by sea, to Cathaia\*."

But, before this expedition could produce its effects, another vessel was fitted up in 1556, the *Searchthrift*, and placed under the command of Stephen Burroughs, who, on the first voyage, had acted as master of Chancellor's vessel. The sole and express destination of this vessel was, the eastern passage by the pole to India. There was as much enthusiasm and hope upon this as upon the first occasion. Cabot came down to Gravesend with a large party of ladies and gentlemen; and having first gone on board, and partaken of such cheer as the vessel afforded, invited Burroughs and his company to a splendid banquet at the sign of the Christopher. After dinner, a dance being proposed, the venerable pilot, as Burroughs tells us in his journal, "for very joy that he had to see the towardness of our intended discovery, entered into the dance himself, amongst the rest of the young and lusty company."

Burroughs set sail from Gravesend on the 29th of April; but did not arrive at the islands and straits of Waygatz, between Nova Zembla and the continent, before the middle of July. The crew were very much alarmed by the monstrous pieces of ice, which they saw floating about, and often became so entangled with them, that they could with difficulty avoid one mass without striking upon another. At one time a huge whale came so close to the ship, that they might have thrust a sword into him; but the commander, fearing lest the monster should overset the vessel, caused the men to shout with all their might, as Nearchus had done many ages before in the Arabian sea. The like effect was produced in both cases: this mighty animal, which is neither ferocious nor very courageous, plunged into the depths with an astounding noise.

Our navigators here fell in with a Russian sail. From their commander, Loshak, they learnt that the country about there belonged to the wild Samoiedes, who were described as cannibals, and worshippers of idols. Burroughs saw in one place more than three hundred of their idols, of the rudest workmanship ever beheld. They consisted of figures of men, women, and children, badly carved, with the eyes, mouths, and other parts stained with blood. These barbarians had no houses; but lived in tents made of deer-skins. Our navigators in all probability found the inhabitants of the polar islands and of the north of Asia, very similar to the occupants of these regions at the present day.

We have a curious story handed down to us of a scene witnessed by Johnson, one of the companions of Burroughs, among the Samoiedes at the mouth of the Pechora, a river at the north-east of European Russia. It is represented as a scene of magic incantation, performed by one of the great northern wizards, who live by deluding the borderers of the Arctic circle.

The magician first took a great sieve, something like a drum; then he began to sing, as people in England halloo, whoop, and shout after the hounds; to which the people present responded with—"Igha, igha, igha!" The conjuror at length fell into convulsions, and dropped down as if dead, though his breathing could still be heard. When Johnson asked the meaning of all this, he was told,—“Now doth our god tell him what we shall do!” After he had remained thus for a short time, the people began to cry "*Aghao, aghao!*"—upon which he arose, and again began to sing. Then he took a sword, and thrust it through his body, so that it entered at the breast, and came out at the back. We are told that Johnson saw it go into the shirt before, and issue out at

the shirt behind; but it does not appear that its actual passage was very narrowly scrutinized, which is quite sufficient to shew that the spectators were imposed upon. The magician then sat down with a vessel of hot water before him, and a line or rope of deer-skin wound round his body; over all of which, as well as himself, a large cloth mantle was spread. The ends of the line being left outside of the mantle, were drawn tight by two men in opposite directions, till something was heard falling into the vessel. Johnson was horrified at being informed that this was the magician's head, shoulder, and left arm, severed from the body by the violent pulling of the rope. When Johnson asked leave to lift the cloak, and view this sad spectacle, he was informed that no one could do so and live. After the multitude had sung and hallooed for some time, the mantle was lifted up, and the conjuror came forth perfectly entire; all the parts cut asunder being understood to have been miraculously replaced. How far soever this gross and obvious imposture succeeded in deluding Johnson, it seems to have had an unlimited effect with the credulous and ignorant natives.

Our sailors had passed fifteen leagues beyond the mouth of the Pechora, and were nearing Nova Zembla, when the advanced season of the year prevented them from penetrating any further. Among other causes are mentioned the hindrance from the north and north-easterly winds, which seemed to the commander more powerful than in any other place; the immense quantity of ice, which seemed likely to be still further accumulated; the nights waxing dark, and winter with all its storms beginning to draw on. On these grounds it was decided to return, and winter at Colmogro; in order to resume their eastward navigation with the ensuing spring: but, in consequence of other employment, this design was not carried into effect, and the vessel returned to England in the succeeding year.

In the mean while Chancellor had proceeded on his mission to Archangel and to Moscow, where affairs had been well and prosperously carried on. The czar, Ivan Vasilovitch, sent back with Chancellor, Osep Nepea Gregorowitch, the regal ambassador and orator, as he was termed, with four ships heavily laden with furs, wax, train-oil, and other Russian commodities, to the value of upwards of 20,000*l.*, which belonged partly to the merchants, and partly to the orator. But the homeward voyage was most calamitous: two of the vessels were wrecked on the coast of Norway; a third reached the Thames; but the Edward Bonadventure, in which were the principal persons of the expedition, was driven by the storm into the bay of Pitsligo, on the north-east of Scotland, where it went entirely to pieces. Chancellor endeavoured, in a very dark night, to convey himself and the ambassador ashore in a boat. This boat was overwhelmed by the tempest, and Chancellor was drowned, together with most of his crew: the ambassador, however, by great good fortune succeeded in reaching the land. He was conducted to London with great pomp, where he was honourably treated by the English government; and the commercial relations of England and Russia were established on a closer and more solid basis.

These polar voyages were now suspended for a while, in consequence of the attention of the Muscovy Company being directed to the establishment of a new mercantile communication with the interior of Asia.

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CREDULITY has been defined to be—Belief without reason. Scepticism is its opposite—Reason without belief.

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HE who is governed by preconceived opinions, may be compared to a spectator who views the surrounding objects through coloured glasses, each assuming a tinge similar to that of the glass employed.—DR. PARIS.

\* Cathaia, or Cathay, is the name formerly given to China, and the east of Asia in general.



### ON THE MEANS OF DIMINISHING FRICTION.

A LARGE portion of the force necessary to every kind of motion is consumed by various obstructions which the moving body has to encounter. The resistance of the air is one of the causes of retardation; a degree of cohesive attraction between the touching substances is another; but the chief impediment arises from the rubbing of the surfaces which come incessantly into contact. This obstructing power inherent to all bodies constitutes friction, which produces so many diversified effects and exerts so extensive an influence in diminishing the performance of all machinery. If we could procure a horizontal plane surface, perfectly free from the smallest inequalities, and then place upon it a flat surface also perfectly smooth, any amount of force applied to such body would set it in motion, and the motion would continue undiminished, except by atmospheric resistance. But when we find that a perfectly smooth surface does not exist in nature, and cannot be formed by art: that every surface, however smooth it may appear to the eye, is full of furrows, prominences, and roughnesses, we need not be surprised at the large amount of force necessary to be maintained for the production of motion of the simplest kind.

In the construction of machines, many ingenious and often complicated methods are devised for diminishing friction. When we find a principle everywhere and at every instant at work, tending to destroy the forces we are producing in the arts and ordinary concerns of life, we constantly complain of it as an evil, and do all we can to remove it; we would even destroy it if we could, and think that machine the most perfect which exhibits the least amount of friction. Yet, were it not for friction, the world would scarcely be habitable. Were there no friction—

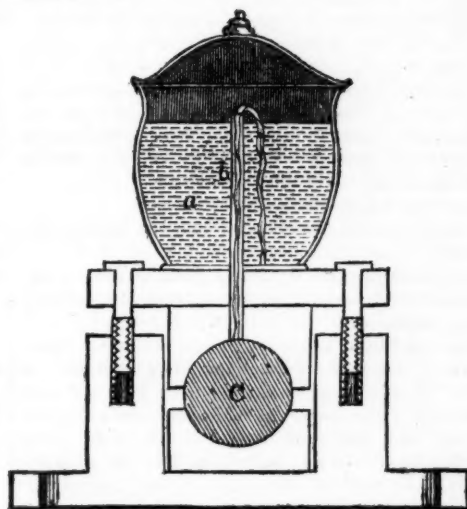
It would be impossible for a man to move from any position in which he might be placed, without the aid of some fixed obstacle by means of which he might pull or push himself forward. And were there no horizontal power of resistance in the ground on which he treads, to destroy the forward motion which he gives himself at every step, he would retain that motion until some obstacle interposed to destroy it; so that the principal part of his time would be spent in oscillating about between the obstacles, natural or artificial, which the earth's surface presented to his motion; an oscillation which would be common to all the objects, animate or inanimate, about him. The slightest wind would sweep him before it; the slightest inclination of his body would bring him to the ground; everything he put out of his hand would start away from him, with the lateral force which he could not fail to communicate to it, in releasing his hold. If he attempted to sit down, his chair would slip from under him; and when he sought to lie down, his couch would glide away from him. He would in all probability be driven to forsake the land, and dwell upon the waters as the more stable element\*.

There are two general methods of investigating the nature and operation of friction. The first method is, to ascertain the weight required to draw a body under the pressure of a given load along the horizontal surface of another. The second is still simpler, and consists merely in raising the end of the upper plane, till it acquires the declination at which the load begins to slide. The extreme declination of the plane is hence called the angle of repose.

The angle of repose often determines the outline of natural objects. Thus, fine sand slides more easily than mould, and hence sand-hills have generally a softer ascent than the grassy flanks of mountains. The latter, without being broken into precipices, may rise at an angle of forty degrees; but the former will seldom support an acclivity above twenty-five degrees. The angle of repose of iron pressing upon iron being sixteen degrees, if the threads or spirals of a vice wind closer

than this inclination, the screw must hold at any place to which it is carried.

The means employed to diminish friction are of two kinds; viz., either by the interposition of unctuous or oily substances between the moving surfaces, or by certain mechanical arrangements. In delicate work, such as clocks and watches, where metal works against metal, the best substance perhaps is olive oil. But in some machines where the strain is very great, solid unguents appear to be preferable to oil, and in such case tallow or hog's lard is usually employed. The "Anti-Attrition Composition," which has been so much advertised for sale, is simply a mixture of four parts of hog's lard and one part of plumbago. In launching a ship the "ways" or sliders are smeared with soft soap. The slope of these sliders is in general not more than from 4 to 5½ degrees. The lowest friction is here exerted, all previous adhesion being destroyed by blows of the mallet, and shocks given in the act of withdrawing the wedges. The momentary friction being 4, leaves an accelerating force of 3, which hurries the vessel forwards, notwithstanding its immense pressure of perhaps 35 tons on every square foot of the slide. If any impediment in the track should stop the progress of the ship, it soon regains such adhesive power as to render its removal very difficult. A tremulous agitation is the only expedient to urge the ponderous mass forward\*.



When oil is applied to lubricate large works, it is apt to drain off, unless means are taken to confine it. The best contrivance for preventing the waste of oil and for keeping gudgeons and axes properly supplied with it, is Barton's Patent Lubricator, the ingenious construction of which will be understood from the accompanying section and description. *a* is a section of a metallic vessel filled with oil and closed by a cover fitting tightly to keep out dust; *b* is a small tube rising nearly to the top of the vessel, with the lower part extending an inch or two below it, and inserted into an aperture made through the block directly over the shaft *c*: through this tube a few threads of woollen yarn are drawn, which reach to the bottom of the vessel, and conduct the oil by capillary attraction, as a syphon, in minute but regular quantities to the shaft or gudgeon *c*: the whole of the oil in the vessel is thus carried over, entirely free from dust or other impurities, and in the precise quantity required, which is easily regulated by the number of threads. The economy of this contrivance is equal to its ingenuity: the machinery to which it is applied will

\* Hence the reason of the sudden falling down of weak or decayed structures. They are upheld long beyond the term of equilibrium, by the rooted adhesion of their parts; but any accidental shock dissolves this union, and the whole pile is precipitated to the ground.—LESLIE.

\* MOSLEY'S *Mechanics applied to the Arts*, 2nd Edition.

run with less friction, last longer, and require less power. The Patent Lubricator has been applied to the wheels of gentlemen's carriages with considerable success: a half a pint of oil will keep the axle well lubricated for a considerable time, and the wheels never require to be taken off for the purpose of greasing.

The mechanical contrivances for the diminution of friction consist either in avoiding the contact of such bodies as produce much friction, or by substituting as much as possible the motion of rolling for that of sliding. Thus, if a heavy load be drawn upon a sledge, the motion is that of sliding which is accompanied by the greatest amount of friction; but if the load be placed upon rollers, the nature of the motion is changed and becomes that in which there is the least amount of friction. Large masses of stone or timber would require an enormous force to move them on a level road, but the motion is easily effected when rollers are put under them.

The wheels of carriages may be regarded as rollers which are being continually carried forward with the load. In addition to the friction on the road, wheels have the friction of the axle in the nave; but they do not have to encounter the friction of rollers with the under surface of the load, nor that of the carriage which bears the load. The advantages of wheel carriages in diminishing friction do not arise, as is sometimes supposed, from the slowness with which the axle moves within the box compared with the rate at which the wheel moves over the road: the amount of friction does not in any case vary considerably with the velocity of the motion. In wheel carriages the roughness of the road is more easily overcome by large wheels than by small ones. The former are not so liable to sink into holes as the latter, and in surmounting an obstacle, the load has to be elevated less abruptly. The smaller the rubbing axis of a wheel, the less the friction. Castors on household furniture act as wheels.

Friction is also diminished when the rubbing surfaces are made of different materials. Axles made of steel may with advantage be made to bear on brass; in small machines, such as time-keepers, the steel axle sometimes plays in agate or diamond cups.

Friction wheels or rollers are sometimes employed to remove the effects of friction. The axle of a wheel, instead of revolving within a hollow cylinder which is fixed, rests upon the edges of wheels which revolve with it. This is a species of motion in which the friction is of least amount. In Atwood's machine described in Vol. XIII., p. 181, of this work, friction wheels are admirably employed.

SWEET is the voice of well-earned praise

To every virtuous ear;  
The inspiring meed of youthful days,  
And e'en to manhood dear.

As opening flowers to sunny skies  
Their blooming fragrance bring;  
Warm'd by the approval of the wise,  
Th' unfolding virtues spring.

Yet oft, with undiscerning mind,  
The applause of man is given:  
But, O my soul! what joy to find  
Thy deeds approved in Heaven.

THE thief who picks our pocket does not so much harm in society, nor occasion so much pain, as they may be charged with, who shock the ear of piety with profaneness, or tear open the wounds of the bleeding heart by forcing upon it some painful recollection.—BEATTIE.

No species of reputation is so cheaply acquired as that derived from death-bed fortitude. When it is fruitless to contend and impossible to fly, little applause is due to that resignation which patiently awaits its doom.—ROSCOE'S *Lorenzo de Medici*.

## PALIMPSESTS.

THE term "*Palimpsest*" has been applied to manuscripts, from which the original writing has been erased, or washed out, and which have been then written on again. The word is aptly chosen, as it implies, according to its derivation from the Greek, the fact of the material for writing on having been *cleansed again*.

The material which, from its tenacity and consistency, was best capable of being submitted to this process, was *parchment*: the reader will find a very interesting article, descriptive of the preparation of this substance, at Vol. XIII., p. 133, of this work.

It seems that the practice of re-cleansing parchment, or removing the first writing, was not confined to the middle or dark ages,—to the inhabitants of the cloisters, but was in vogue even before the Christian era: it was probably resorted to from the time of the first production of parchment itself; for we are told that this material was always a scarce commodity until rather recent times. A preparation for effacing the original writing on parchment was known in the time of Augustus Cæsar; and Cicero, when writing to one of his friends, commends him for having been so economical as to write on a palimpsest, but says that he should like to know what those writings could possibly have been which were considered of less importance than a letter.

The ancients were in the habit of using likewise leaves or strips of the papyrus plant for the purposes of writing. This plant is common in Abyssinia, Egypt, and Syria, and is also met with in Calabria and Sicily; it inhabits both stagnant waters and running streams. The English word "*paper*," is derived from the name of this plant. The ancients had also a method of cleansing the papyrus-leaves of the original writing, though this substance was naturally very delicate and friable.

That parchment was a very costly material in the middle ages may be known from the fact that when Guy, count of Nevers, sent a valuable present of plate to the Chartreux of Paris, the unostentatious monks returned it with a request that he would send them parchment instead.

The scarcity and expense of parchment, therefore, and the demand for the writings of the Fathers and books of devotion in those times, frequently induced the monks to erase or wash out the writings of the classical authors, to make room for those of the Fathers. The original writing upon the parchment could be scratched out, and a peculiar kind of knife belonged to the apparatus of a transcriber; the parchment scratched in this manner was rubbed over with pumice-stone, to render it more fit for writing. The practice of thus removing old writings for the sake of the parchment was so common in the fourteenth and fifteenth centuries, that when the emperor of Germany empowered the creation of an imperial notary, one of the chief articles of the diploma of this officer was, that he should not use scraped vellum in drawing deeds. The manufacture of parchment has certainly been carried on in all ages; but that of the ancients was distinguished for its beauty, strength, and whiteness; for which reason, in later ages, a palimpsest of the ancient parchment was preferred to all the preparations of the new.

But, in many cases, the monks were not able to obliterate entirely the ancient writings; and a careful examination of these palimpsest manuscripts has led to the discovery of some valuable works and fragments of the classical authors. Among the most important is the treatise of Cicero "*on the Republic*," which was found in the Vatican Library at Rome by Angelo Mai, in a manuscript which had been re-written with the Commentary of St. Augustin on the Psalms. The *Institutions* of Gaius, which contained the Roman code of laws at the commencement of the Christian era, were also recovered



in a similar manner in the library of the chapter of Verona.

This latter manuscript consists of 127 sheets of parchment, the original writing on which was the four books of the *Institutions*, by Gaius, a Roman, who lived about the year A.D. 150. This original writing had, on some pages, been washed out, so far as was practicable, and on others scratched out; and the whole, with the exception of two sheets, had been re-written with the Epistles of St. Jerome. The lines of the original and of the substituted writing run in the same direction, and often cover one another;—a circumstance which considerably increased the difficulty of deciphering the text of Gaius. In addition to this, sixty-three pages had been written on *three* times: the first writing was the text of Gaius, which had been erased; and the second, which was a theological work, had shared the same fate, to make room for the Epistles of St. Jerome. This work of Gaius was found and restored in the year 1816.

The re-production of the traces of the original writing on the parchments has not, however, always been found so difficult a matter as in the case of the *Institutions* of Gaius. As the transcribers in the middle ages, when the want of writing-materials was felt, in consequence of the great demand for missals, &c., often divided the large sheets of written parchment, the second set of lines is sometimes found diagonal to the first; so that the old and new cross each other, or the old lines have remained above the others.

We thus see that some valuable writings of the ancients have already been recovered from beneath monkish effusions or superstitious legends, by carefully following the traces of the pen or style, which had impressed the former performance upon the membrane; and which traces still continued to exist in spite of the impressions made by the second scribe. The original characters thus often remain legible, so as to be visible to the naked eye; or they may be made to appear with the assistance of chemical agents. Persons whose business it was in the middle ages to prepare parchments by erasing manuscripts, were called "parchment-restorers."

This subject has greatly attracted the attention of *philologists*, or lovers of literature, for some years past. The increasing zeal in the search for remains of classic learning has directed the attention of the most erudite scholars to these hidden treasures; and we may hope that the great collections of manuscripts at Rome, Naples, Oxford, Cambridge, &c., which have been as yet but little examined, will afford us many more remnants of the literature of olden time.

#### THE MECHANICAL PROCESSES OF SCULPTURE.

It is difficult to name a branch of art, the successful application of which requires a more varied combination of powers than that of sculpture. The artist places before him a lifeless, shapeless block of marble, and from this he elaborates a figure which represents all the personal beauties of the human form, and in some instances almost seems to represent *mind*, as manifested by the expression of the features. Not only must the sculptor be familiarly acquainted with the anatomy of the human form, and those nice gradations of expression which indicate the varied workings of the mind within, but he must also possess consummate mechanical tact, in cutting the block neither more nor less than is necessary for the production of the desired effect. There is one very marked distinction between the labours of the painter and those of the sculptor: if the former employ a wrong colour, or use it injudiciously, he can repair his error, either by removing the paint, or by working upon it; but if the sculptor were to chisel away too much of his marble at any one point, no subsequent repair would

adequately restore the deficiency. Having in another place treated of sculpture as a fine art, we now propose to give a brief description of the mechanical process of sculpture.

It must not be supposed that the sculptor produces a statue or bust without any copy to guide him. He *models* a figure in the first instance of some plastic and yielding substance, and when this model is completed he imitates it by cutting the block of marble to a similar form. The model is built up or formed piece-meal, not hewn or cut out of a solid lump, and the modeller is thus enabled to attain the desired form with more ease, because he can add or remove small portions of the substance at pleasure. It appears pretty certain that the ancients almost always formed their first models in wax, although in modern times clay is generally used for this purpose. This preference of the ancients for the use of wax did not result from their non-acquaintance with the use of clay, but from certain advantages which wax possesses over clay. Indeed, as has been observed by a recent writer, if clay could be made to retain its original moisture, it would undoubtedly be the fittest substance for the models of the sculptor, but when it is placed either in the fire, or left to dry imperceptibly in the air, its solid parts grow more compact, and the figure, losing thus a part of its dimensions, is necessarily reduced to a smaller volume. This diminution would be of no consequence if it affected the whole figure equally, so as to preserve the proportions unaltered, but in effect the smaller parts of the figure dry sooner than the larger, and thus losing more of their dimensions than the latter in a given space of time, the symmetry and proportion of the figure somewhat suffer. On the other hand, wax cannot be worked up so smoothly to represent the fleshy parts as clay, and hence the plan usually followed is a combination of both, by making a model of clay, then making a mould of plaster from this model, and lastly casting a second model, from this mould, in wax.

When the artist has prepared a drawing conveying a general idea of the figure to be modelled, he proceeds to build up his statue or group, for which purpose a general nucleus or skeleton is first formed of wood or iron: to this small crosses are generally attached, in order to form fixed points of support for the clay. The clay, carefully prepared for that purpose, is then laid on the skeleton, either by the hand, or by some convenient implement, and by means of small wood or ivory tools, with their ends pointed, round, square, or diagonal, he gives the clay the required form. Whether the figures are or are not to be covered with drapery, he models them naked, in order to insure correctness of anatomical detail, and afterwards, if requisite, forms the drapery by extra layers of clay.

When the model is completed, it is not often that the sculptor proceeds to chisel his marble from the clay model as a pattern, but he forms a plaster mould, from which to obtain a plaster or wax figure. Supposing, for simplicity of description, that the work is a bust, he encases the clay model of the bust with a thin stratum of cream-like plaster; but as this case has afterwards to be removed from the model, he adopts the following plan. A thin edge or ledge of clay is laid along the bust from the head to the base, on both sides, so as to form a separation between the front and back portions of the bust, and the front is first completed up to this ridge of clay, the moulder carefully casting the thin plaster into the recesses of the eyes, ears, nostrils, &c. A thicker plaster is then thrown on, till a thickness of two or more inches is obtained. The ridge of clay is now removed, the edges of the plaster are slightly touched with oil, and the back is covered in the same way, till the whole becomes a shapeless lump of plaster. This lump is, when dry, separated by a few blows with the mallet and chisel, so as to come off the model in two pieces, which together form a mould or counterpart of

the model. These two pieces, after being cleaned, are slightly moistened with oil, and united again with cords wrapped round them. A plaster cast from this mould is then obtained, by pouring liquid plaster into it, and by breaking or separating the two halves of the mould when the plaster has set: if the cast be of wax instead of plaster, the mode of casting is nearly the same.

When the clay, plaster, or wax model is completed, the sculptor proceeds to imitate it in marble. There are various contrivances for guiding him in this operation,—of which one is as follows. A number of small black points are marked upon the model in every principal projection and depression, to give the distances, heights, and breadths sufficient to copy the model with exactness. The ancients effected this by considering every three points on the figure as forming a triangle, which they made in the marble to correspond with the same three points in the model, by trying it with a perpendicular line, or some other definite line, both in the marble and in the model.

Another contrivance, suggested by the Academy of Painting at Rome, is the following. The statue or model which is to be copied is inclosed in a frame that fits it exactly; the upper part of which is divided into a certain number of equal parts; and to each of these parts a thread is fixed, with a piece of lead at the end of it. These threads, hanging freely downwards, shew what parts of the stone are most removed from the centre, with much more perspicuity and precision than the dots before spoken of; and they also afford the sculptor a tolerable rule by which he may measure the more striking variations of height and depth. But a serious difficulty nevertheless attends the use of this method; for as it is impossible by means of a straight line to determine with precision the direction and nature of a curve, the sculptor has no certain rule to guide him in his contours; and whenever the line which he is to describe deviates from the direction of a plumb-line or vertical, he must necessarily feel at a loss, and proceed somewhat on conjecture. Another inconvenience attending this method is, that there is no certain rule to determine exactly the proportion which the various parts of the figure ought to bear to each other. Even if horizontal lines be drawn intersecting the plumb-lines, the difficulty is not wholly removed; for the squares formed by transverse lines that are at a distance from the figure, although they be exactly equal, yet represent the parts of the figure greater or smaller, according as they are more or less removed from our position or point of view. Still however, notwithstanding these defects, this method is deemed by some persons the best that has been devised.

A third method, and the one most generally adopted in modern practice, is the following. When the block of marble is ascertained to be of sufficient size, it is fixed on a basement of stone, or a strong wooden bench called a *banker*, in front of which is a long strip of marble, divided into feet and inches. Another strip of marble divided in the same manner, is placed below in front of the model; and a wooden perpendicular rule, the height of the work, is placed so as to be moveable from the strip of marble or scale under the model to that which is under the block to be cut. This wooden rule is first placed on the scale of the model; and the exact distance from it to any prominent part, such as the nose or chin, for example, having been taken, the rule is removed to a corresponding position on the other scale, and the workman cuts away the marble to the same distance from the perpendicular at the same height, that is, till he has arrived at that point of the block which is to form the prominent part in question. The sculptor then proceeds in the same way with other prominent parts; and afterwards to the depressions which intervene between them; until he has at length obtained a rough figure, containing within it all the other minute

details which remain to be brought out by the skilful hand of the master.

A variation of the above method is practised by some sculptors. The model and block of marble being ranged side by side on the bench or platform, a brass frame is placed in front, on which slides a brass perpendicular joint. This joint carries a tube through which a rod passes, and which is brought in front of the model, to some particular part of which the point of the rod is applied; the point being set, it is retained at that distance in the tube by a screw. The instrument is now placed in a corresponding position in front of the block, on which the position of the point is marked by the end of the rod. A hole is now drilled in the block in this place, to such a depth as to allow the sliding rod to penetrate it to the proper distance. Another point is now taken, and the block drilled in a similar manner; till at length it is pierced in every direction. These parts are then cut away with the chisel, care being taken never to remove any part below where the drill has been. Mr. Behnes, the sculptor, has invented a very ingenious machine for producing the required effect somewhat in this manner.

When the assistant workmen have, in some one of the ways described above, brought the block of marble to a rough stage of approximation to the desired form, the master-hand proceeds with his delicate and difficult work. He chisels the figure with a flat-ended steel tool about half an inch broad. In the plain parts he cuts a channel in the surface from one given point to another; then cuts other channels parallel with it, leaving intervening ridges about an eighth of an inch broad; then cuts other channels in a direction at right angles with the former; and lastly cuts away the remaining rough surface. It is found that by no other means can he produce a level and regular surface; but this being once produced, he can easily vary it with the requisite undulations. Generally speaking, the chisel and hammer are the tools employed; but when the hollows are so deep and intricate as not to be easily reached by this means, drills of different kinds are employed, followed by other tools furnished with long handles, and worked by the hand only, without the use of a hammer. It need scarcely be observed, that to produce a successful imitation of the fullness of muscle, the pliability of the softer parts, the strength of tendons, and the firmness of bone, requires that the sculptor should be well acquainted with the anatomical characteristics of the several parts. The light, soft, and curly appearance of the hair requires considerable manual dexterity to imitate.

When the chiselling is completed, the surface of the marble requires another process to bring it to a smooth state. This is effected by the use of rasps and files, made for this purpose in Italy; coarser rasps being used first, and then very fine files. If any part of the piece of sculpture is required to have an unusually smooth surface, it is rubbed over with pumice stone after the file has been used; and sometimes the whole surface is rubbed or ground carefully over with small pieces of grit-stone, accommodated to the various forms of the surface, as to flat spaces, rounds, hollows, &c. The hair does not admit of being finished in this way, as the delicacy and lightness of its appearance requires that the finishing touches should be given by a very fine and keen-edged tool.

If the bust or figure on which the sculptor is at work be not very large, he places it on a large, square, four-footed stool, provided with a movable top which turns round on brass or iron balls.

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